RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

March 11, 2011

Representative Joseph McNamara
Chair/Health, Education &Welfare Committee
Representative-District 19-Cranston/Warwick
23 Howie Avenue
Warwick, RI 02888

RE: Proposed Pawtuxet Falls Dam Removal
RIDEM Wetlands Application # ARRA 10-009

Dear Rep. McNamara,

I am writing to respond to your concerns regarding the proposed removal of the Pawtuxet Falls Dam, located in the village of Pawtuxet in the cities of Cranston and Warwick, as outlined in your September 16, 2010 letter sent to Mr. Thomas Ardito of the Narragansett Bay Estuary Program. Specifically, this letter addresses the following concerns raised by your letter:

1) That the removal of the dam and subsequent lowering of the surface water elevation will have harmful effects on the adjacent wetlands;

2) That the lowering of the surface water elevations will allow contaminated sediments to be exposed, with specific concern regarding paracresol resulting from a 1983 release by Ciba Geigy;

3) That additional information be gathered addressing the feasibility of a fish ladder ;

4) That the aesthetic value of the Pawtuxet Falls Dam will be lost if the dam is removed.
A response to each concern is presented below.

Response to Issue 1

The removal of the dam will have beneficial effects on adjacent wetlands. These wetlands include the 200 ft. riverbank wetland, two separate swamp fringe wetlands located on both sides on the river channel, the riverine wetland, and the Pawtuxet River. The greatest change to the river from the dam removal will be a projected 3.64 foot reduction in water surface elevation immediately upstream of the present dam. This change will progressively decrease upstream of the dam removal site. The removal of the dam will

allow the re-introduction of the native estuarine ecology of the Lower Pawtuxet River by restoring fish and wildlife which are an important biological component of natural riverine wetlands. The lowering of the surface water will improve wetland functions and values for a variety of reasons. The dam removal will allow for the increase in flood storage capacity thereby improving water quality and decreasing sediment loading by allowing for higher residence time for run off within the catchment system. It will improve water quality parameters such as an increase in water velocity, decrease in water temperature, and an increase in dissolved oxygen. The dam removal will also increase the riverine wetland, the shallow bottom aquatic beds located along the riverbank within the channel, thereby increasing spawning areas for migratory fish. By restoring the connectivity of the Lower Pawtuxet River, the aforementioned benefits will collectively increase the value of the habitat thereby improving the overall health of the river. All onsite wetlands have been significantly altered as a result of the installation of the Pawtuxet Falls Dam.

Response to Issue 2

The lowering of the surface water elevation will allow for more exposed riverbank. As previously mentioned the highest expected drop in surface water elevation will occur directly behind dam at approximately 3.64 ft. and then decreasing the further upstream from the dam. In March 2010, sediment samples collected by EA Engineering showed that out of six samples collected at various locations upstream of the dam, all samples had contamination with one or more contaminants that exceeded the Rhode Island DEM's Residential and Industrial Direct Exposure Criteria. These results are typical of those which would be expected of any urban river in Rhode Island. Contaminants such as Total Petroleum Hydrocarbons, Arsenic, Beryllium, Lead, PCB's, Benzo(a)pyrene, Bis(2ethyhexyl)phthalate, and Chrysene. Please note that these exceedances reported are just above the regulatory limits and do not represent an increased risk over existing conditions. (Note that RIDEM is in the process of changing the management standards for Arsenic and increasing the standard for Beryllium for both Residential and Industrial/Commercial land use). Because of the historic use of the river for industrial discharges for the past 200 years, the sprawling urban development within the catchment system, and the approximately 835 discharges currently permitted on the Pawtuxet River, it is an arduous if not impossible task to pinpoint the exact source for these contaminants found in the aforementioned 2010 sediment samples. The exposed riverbank that will result from the dam removal will be re-vegetated and stabilized with salt tolerant, thorny, native wetland vegetation to strongly dissuade any trespassing. The Department feels that this remedial measure will greatly reduce any potential human risk.

With respect to Ciba Geigy and the concern with paracresol contamination in sediments within the limits of disturbance of the proposed dam removal, the following information was gathered by the remedial project manager (RPM) of USEPA Frank Bataglia. Mr. Bataglia has been the active project manager for the Ciba Geigy site for quite some time and has provided the following information synthesizing its history. The Ciba Geigy factory was closed in 1986 after a release of hazardous materials. A spill of paracresol occurred at the facility in 1983 into the Pawtuxet River. In 1987 and 1988, several on-site

buildings were demolished and the company entered into a Consent Agreement with USEPA requiring the clean up of contamination on-site and off-site. The remedial investigation continued into the 1990's when the majority of sampling was performed. On site soils, groundwater, and sediments were analyzed for over 220 hazardous chemicals including paracresol. Paracresol was not one of the chemicals found in the any of the aforementioned media. The 1983 spill of paracresol may have been significant in 1983, but in 2010 the impact is very insignificant. Attached you will find a Material Safety Data Sheet (MSDS) for paracresol which discuses the reasons why paracresol is not currently a concern. The reasons why paracresol was never detected in any on-site and off-site samples is because of its high solubility and short half life. Paracresol is soluble in water at approximately 25 grams per liter of water at 40 degrees centigrade. This is about 1 ounce per quart or about 1 pound per 4 gallons of water. The Pawtuxet River has an average flow that exceeds several millions gallons per day suggesting that all of the 72,000 lbs of paracresol released in 1983 was totally absorbed in river water and dissipated downstream. The MSDS also states that when released into water, this chemical is expected to readily biodegrade to lesser toxic substances and have a half life of between 1 and 10 days. It is for these reasons that paracresol was never detected in sediments during the 1990's sampling events and it will not be detected in current conditions.

During the clean up of Ciba Geigy, which is now in the monitoring phase of the remedial process, 2,100 cubic yards of contaminated soil and over 110 cubic yards of sediments from the Pawtuxet River were removed and disposed off-site. The areas where sources were removed were then backfilled with clean fill material thereby effectively getting rid of the source of contamination. In the mid 1990's after source removal occurred, Ciba Geigy installed a Soil Vapor Extraction system (SVE) and Groundwater Pump and Treat system to deal with the residual contamination. The groundwater system was decommissioned in 2010 and the SVE system was decommissioned in 2002. In 2002, downstream and upstream sediment samples were collected. Analysis showed that sediment quality had improved since the source removal occurred and treatment systems were installed. The reference to a 1981 EPA study determing that paracresol is acutely toxic was most likely conducted on the waste prior to treatment. These studies usually were conducted to determine what the discharge limits should be for specific chemicals. Acutely toxic refers to a short term toxicity not long term, in which the term chronic would be used. The combination of the analytical results, the acutely toxic properties of paracresol, and the chemical properties of paracresol provide no evidence that this contaminant remains in sediments downstream of the Ciba Geigy facility 27 years after the release occurred.

Response to Issue 3

To address your concern of a fish ladder and associated feasibility study, a feasibility study was completed in 2008 as part of this project. The target species for this restoration project are River Herring and American Shad. It was determined from a Rhode Island Strategic Plan for Anadromous Fish Restoration (anadromous fish are those which live as adults in salt water, but must return to fresh water to reproduce) that the Lower Pawtuxet

River is suitable to support these target species. This strategic plan also identified that White Sucker, Brown Bullhead, and Bluegill were currently observed in the Lower Pawtuxet River and have very similar water quality requirements and habitat requirements as the target species.

In 2008, Milone and McBroom, Inc. (MMI), one of the country's leading river restoration engineering firms, completed an exhaustive assessment of potential alternatives for restoring the fisheries and improving the ecosystem of the lower Pawtuxet River. The report evaluated four alternatives: 1) Full Dam Removal; 2) Partial Dam Removal; 3) Rock Ramp Fishway Construction 4) Fish Ladder (Denil Fishway) Construction. The report concluded that Partial Dam Removal will provide the greatest environmental and community benefits—maximizing fish passage while providing a modest reduction in property flooding along the Pawtuxet River which, as you know, has caused great economic harm to residents and businesses in Warwick and Cranston. The report further concluded that a fish ladder would not be effective at this location, due to the configuration of the bedrock below the dam. As a result of these conclusions, the project team and funding agencies moved forward to design and permit the partial dam removal at Pawtuxet Falls. It is important to note that there is no funding available for fish ladder construction at Pawtuxet Falls.

Further, a letter sent from the Catherine Sparks, Chief of the RIDEM's Division of Forest Environment (see enclosed letter) on October 18, 2010 supports the partial dam removal.

Response to Issue 4

Lastly, your comment regarding the concern that the aesthetic value of the falls will be lost with the proposed dam removal, the Pawtuxet Falls were falls long before the construction of the dam in the 1800's. The natural bedrock outcroppings provide a natural falls. While the post dam removal conditions will certainly not be the same as they are currently, falls will still be present and will continue to provide the same pleasing value that currently exists with the increased values expected from fish restoration.

This concludes RIDEM's comments to your September 16, 2010 letter. I hope this information alleviates your concerns. If you have any further question regarding this project, please feel free to contact me or Ann Battersby by phone at 1 (401) 222-4700 ext. 7500 or 7284 or by email at ron.gagnon@dem.ri.gov or ann.battersby@dem.ri.gov.

Sincerely,

Ronald N Gagnon

Ronald N Gagnon, P.E., Chief
Office of Technical and Customer Assistance

Cc: Thomas Ardito, Narragansett Bay Estuary Program
Project File

MSDS Number: C5467 * * * * * *Effective Date: 07/26/07* * * * * *Supercedes: 05/07/07*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

JTBaker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

p-CRESOL

1. Product Identification

Synonyms: 4-methylphenol; 4-Cresol; 1-Hydroxy-4-Methylbenzene
CAS No.: 106-44-5
Molecular Weight: 108.14
Chemical Formula: CH3C6H4OH
Product Codes: F847

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
p-Cresol	106-44-5	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, PANCREAS AND CARDIOVASCULAR SYSTEM. VAPOR IS IRRITATING TO EYES AND RESPIRATORY TRACT. COMBUSTIBLE LIQUID AND VAPOR.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)
Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: White (Corrosive)

Potential Health Effects

Cresol is toxic via ingestion and skin absorption. Cresol is similar to phenol in its action on the body, but is less severe in its effects.

Inhalation:
Breathing vapor, dust or mist results in digestive disturbances (vomiting, difficulty in swallowing, diarrhea, loss of appetite). Will irritate, possibly burn respiratory tract. Other symptoms listed under ingestion may also occur.
Ingestion:
Poison. Symptoms may include burning pain in mouth and throat, abdominal pain, headache, dizziness, muscular weakness, irregular breathing, weak pulse, lung damage, liver damage, pancreas damage, kidney damage, coma, and possibly death from circulatory or cardiac failure.
Skin Contact:
Corrosive. Causes severe pain followed by numbness. May be absorbed through the skin with systemic poisoning effects to follow. Discoloration and severe burns may occur.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Repeated exposure may cause symptoms described for acute poisoning as well as liver damage.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Onset of systemic effects may be delayed as long as 72 hours.

5. Fire Fighting Measures

Fire:
Flash point: 86C (187F) CC
Autoignition temperature: 559C (1038F)
Flammable limits in air % by volume;
lel: 1.1
Combustible Liquid and Vapor! Contact with strong oxidizers may cause fire.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.

Solid Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

Liquid Spills: Absorb with vermiculite, dry sand, earth or similar material and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer.

Any Spill:
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Containers of this material may be hazardous when empty since they retain product residues (dust, solids, vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
5 ppm (TWA) (skin), cresol, all isomers

-ACGIH Threshold Limit Value (TLV):
5 ppm (TWA) (skin), cresol, all isomers
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH type P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Crystals or liquid becoming dark with age.
Odor:
Phenolic odor.
Solubility:
Slightly soluble in water.
Specific Gravity:
1.0178
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
201C (394F)
Melting Point:
34.8C (95F)
Vapor Density (Air=1):
3.72
Vapor Pressure (mm Hg):
1 @ 53C (127F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
May produce acrid smoke and irritating fumes when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Acids, bases, oxidizing agents.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 207 mg/Kg;Inhalation rat LD50: > 710 mg/m3; skin rabbit LD50: 301 mg/kg; investigated as a tumorigen, mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
p-Cresol (106-44-5)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to evaporate significantly. When released into water, this material is expected to readily biodegrade. When released into water, this material is not expected to evaporate significantly. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition. When released into the air, this material is expected to have a half-life of less than 1 day.
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: CRESOLS
Hazard Class: 6.1, 8
UN/NA: UN2076
Packing Group: II
Information reported for product/size: 500ML

International (Water, I.M.O.)

Proper Shipping Name: CRESOLS, LIQUID
Hazard Class: 6.1, 8
UN/NA: UN2076
Packing Group: II
Information reported for product/size: 500ML

International (Air, I.C.A.O.)

Proper Shipping Name: CRESOLS
Hazard Class: 6.1, 8
UN/NA: UN2076
Packing Group: II
Information reported for product/size: 500ML

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
p-Cresol (106-44-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
p-Cresol (106-44-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\-----------------

Ingredient	-SARA 302- RQ	TPQ	-----SARA 313----- List	Chemical Catg.
p-Cresol (106-44-5)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\-----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
p-Cresol (106-44-5)	100	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: 2X
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: 3 Flammability: 1 Reactivity: 0
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, PANCREAS AND CARDIOVASCULAR SYSTEM. VAPOR IS IRRITATING TO EYES AND RESPIRATORY TRACT. COMBUSTIBLE LIQUID AND VAPOR.
Label Precautions:
Do not breathe vapor.
Do not get in eyes, on skin, or on clothing.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat, sparks and flame.
Label First Aid:
In all cases call a physician immediately. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Product Use:

Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Rhode Island
Department of Environmental Management

DIVISION OF FOREST ENVIRONMENT
1037 Hartford Pike
North Scituate, RI 02857

October 18, 2010

Ron Gagnon, Chief
Office of Customer & Technical Assistance
235 Promenade St.
Providence, RI 02908

Dear Ron,

This letter is in response to the Pawtuxet River Authority and partners proposed Pawtuxet River Restoration project. The project involves the removal of the Pawtuxet Falls Dam and currently your office is reviewing the permit application. The proposed project will allow anadromous fish access to miles of riverine spawning and nursery habitat, provide for the maturation of adult American eels and create connectivity along the river for resident species. Currently, the proposed dam removal project is planned for 2011.

The Division has not confirmed anadromous fish above or below the Pawtuxet Falls Dam but has had reports of river herring passing the falls during certain conditions in the spring. Numerous efforts to sample these fish have failed in the past due to limited access and safety reasons. Staff biologists believe during certain spring conditions, anadromous fish may be able to pass, but this does not occur every year and is not very efficient in years in which it does. RI Commissioners of Inland Fisheries Reports from 1880, note the construction of the first fish ladder in RI was at the Pawtuxet Falls Dam.

Staff biologists have participated on the Plan Management Team and believe the proposed alternate of partial dam removal and channel will provide adequate fish passage for several anadromous fish species as long as average spring flows do not create velocity barriers for migrating fish. Staff biologist believe engineers are working on final designs to ensure average mean water flows in the spring do not create velocities in which restrict fish passage in the channel section of the partial dam removal.

There are many partners working together on the project, and the Division is planning for future stockings of anadromous fish in an effort to "jump start" the system. As it pertains to fish passage, this project is a high priority for the Division, therefore the RIDEM Division of Forest Environment supports this restoration project. If you have any questions, please feel free to contact me at (401) 647-3367.

Sincerely,

Catherine Sparks
Chief, Division of Forest Environment
Freshwater Fisheries and Wildlife Sections, DFW

Cc: Christine Dudley
Phil Edwards